



Features of the Clinical Course of Pulpitis in Temporary Teeth in Children

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Abstract: Treatment of pulp pathology of both temporary teeth and permanent teeth with incomplete root formation is one of the most complex and responsible activities in pediatric dental practice.

Key words: pulpitis, permanent teeth, children.

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Treatment of pulpitis in children is often associated with certain difficulties due to the clinical manifestations of pulpitis (pain on the eve or during diagnosis), the behavior of the child, and structural features of the teeth. A correct diagnosis will help to choose the optimal method of treatment, which will provide the greatest likelihood of long-term success of therapy and minimize the possibility of complications. The further fate of the tooth depends on the correct choice of the method of treatment and the implementation of therapeutic measures: the preservation of the viability of the pulp, the possibility of growth and formation of roots, their physiological resorption and functional value.

It should be taken into account that dental interventions in children are often carried out on developing tooth structures characterized by functional immaturity and the possibility of an inadequate response of the pulp to various stimuli, an unformed apical region. This zone has a significant cellular potential, is richly vascularized, and is directly involved in the formation of the apical third of the root. Preservation of the viability of the entire pulp or its root part is a necessary condition for the growth of the root in length and thickening of its walls, which ensures adequate resistance of the tooth to functional loads. Therefore, all therapeutic interventions should be as sparing as possible and aimed at creating physiological conditions for the formation of tooth structures and surrounding tissues. However, be aware of possible complications.

When choosing a treatment method for inflamed pulp in children, a number of factors must be considered:

- form of pulpitis flow;
- degree of caries activity;

- stage of root formation;
- data on the electrical excitability of the pulp;
- the general health of the child;
- psycho-emotional status of the child.

The main objectives of the treatment of pulpitis in children:

1. Elimination of pain.
2. Elimination of odontogenic inflammation and prevention of periodontal diseases, jaw bones and surrounding soft tissues.
3. Restoring the functional value of an unformed tooth and ensuring physiological resorption of the roots of temporary teeth.

Methods of treatment of pulpitis can be divided into conservative and surgical.

Conservative methods are aimed at maintaining the viability of the entire pulp. This is a biological method, a method of indirect pulp therapy, direct pulp capping.

Surgical methods involve the removal of the coronal pulp (pulpotomy or amputation) or the entire pulp (pulpectomy or extraction). Surgical treatments performed under conditions of anesthesia are called vital amputation or vital extirpation, after preliminary devitalization - devital amputation and devital extirpation. Complete removal of the inflamed tooth pulp is chosen by pediatric dentists in relation to the formed permanent and, in some cases, temporary teeth. It should be remembered that both temporary and permanent teeth erupt into the oral cavity immature and it takes time for their final formation. The formation of the roots of temporary teeth ends by 4 years, and for permanent teeth, the time for the formation of roots is 3–4 years after eruption.

The leading role in the formation and growth of the tooth root belongs to the pulp. This determines the desire of a pediatric dentist in the treatment of pulpitis in such a tooth to keep the entire pulp viable, and if it is impossible, at least part of the pulp for further full-fledged tooth formation. In addition, the frequency of pulpitis of temporary teeth at the age of 5–9 years increases, and at the same time, the processes of physiological resorption of the roots of temporary teeth begin, which necessitates the frequent use of pulpotomy. Biological method of treatment of pulpitis It is used in the practice of pediatric dentists in neighboring countries and in our republic. This method makes it possible to preserve the viability and physiological activity of the entire dental pulp due to the ongoing anti-inflammatory treatment of the inflamed pulp. pulpitis, which arose for the first time (chronic ulcerative pulpitis, chronic pulpitis,) [2].

According to the results of many studies, these forms of pulpitis are reversible, since only at these stages the dental pulp is capable of regeneration [5, 8].

Conditions that ensure the success of biological treatment:

- 1) the difference in the EDI readings of the causative tooth and a symmetrical healthy one should not exceed 25 μ A;
- 2) compensated form of caries;
- 3) adequate behavior of the patient;
- 4) the absence of general somatic and chronic diseases in the child;
- 5) the ability to create aseptic working conditions (work with a rubber dam, saliva ejector);

- 6) localization of the carious cavity on the chewing surface;
- 7) good oral hygiene.

The biological method in the treatment of pulpitis of temporary teeth is used to a limited extent. There are much more opportunities for its successful implementation in immature permanent teeth due to the high ability of the pulp of young, “immature” permanent teeth to regenerate, due to the anatomical, physiological and morphological features of its structure. The pulp of permanent teeth with incomplete root formation is capable of exhibiting pronounced reparative and plastic properties, depending on the age and general health of the child. The effectiveness of the method depends on the virulence of the microflora of the carious cavity, the sensitivity of microorganisms to antibacterial drugs, biological antiseptics, their combinations with corticosteroids and other drugs. A number of experts believe that it is possible to preserve the inflamed pulp with reversible forms of pulpitis [5, 8].

In this case, an additional stage in the treatment is necessary: the impact on the infected dentin and the reactively altered inflamed pulp. With strict adherence to the indications and the necessary conditions, good results can be obtained in the treatment of immature permanent teeth in children, although there are occasional discussions about the appropriateness of this technique [5, 6, 7, 9]

The method of indirect pulp therapy consists in the fact that carious dentin is not removed at once, but over several visits. At the first stage of treatment, necrectomy of the infected layers of carious dentin is performed (partial necrectomy). The walls of the carious cavity after preparation should be represented by healthy tissues. When removing carious tissues, it is necessary to leave a sufficient amount of dentin in the projection area of the pulp horns in order to avoid opening the tooth cavity. The softened dentin remaining at the bottom, containing no or minimal amount of pathogenic microorganisms, is covered with a therapeutic pad based on calcium hydroxide or zinc oxide eugenol. Calcium hydroxide has a pronounced anti-inflammatory and antibacterial effect, but does not have an analgesic effect. Paste based on zinc oxide eugenol, on the contrary, has a local anesthetic and antiseptic effect due to eugenol, which reduces the production of prostaglandins, and zinc oxide has an antibacterial and anti-inflammatory effect.

The carious cavity is hermetically sealed with a stable temporary biocompatible filling material. As a result of these therapeutic measures, the carious process is suspended and conditions are created for the formation of reparative (secondary replacement, tertiary) dentin by the pulp and, as a result, the risk of opening the tooth cavity during the final excavation of the remaining carious tissues during the second visit is reduced. It has been established that after the preparation of the carious cavity, the rate of formation of reparative dentin is on average 1.4 microns per day. Studies by American scientists have shown that the formation of replacement dentin during indirect pulp treatment occurred to a greater extent during the first month of treatment and lasted up to a year. After a year, the layer of formed replacement dentin at the bottom of the cavity was about 390 µm. These observations confirm the possibility of temporary tooth filling for a period of more than 6 weeks. Therefore, the minimum time interval between visits should be 6-8 weeks, the maximum - 6-12 months. During this time, the carious process in the deep layers of the dentin stops. After 6-8 weeks, the temporary restoration is removed. Under the carious tissues, already compacted and sclerosed, healthy dentin is found, and the tooth cavity is unopened. Thus, the purpose of the method of indirect pulp therapy is to reduce the likelihood of accidental opening of the tooth cavity in the process of treating deep carious cavities by gradually removing carious dentin and stimulating dentinogenesis.

The method of direct capping of the dental pulp provides for the preservation of the viability and functional features of the exposed pulp. Subject to certain clinical indications and proper treatment, the success of the method reaches 90%. Opening the pulp does not always mean its death. The reality of the treatment of traumatic pulpitis in their writings is reported by dentists from around the world. The

success of their methods is based on the presence of a healthy dentinal structure, the obligatory antiseptic treatment of the cavity and adherence to the restoration technique [5, 9].

The success of the treatment of exposed pulp is determined by:

the initial state of the pulp (diagnosis before treatment);

material used for pulp therapy;

tightness of pulp isolation after tooth restoration. Pulp preservation by direct capping is only possible in teeth with a healthy, non-inflamed pulp.

Diagnosis before treatment is often difficult, since it is possible to reliably diagnose a healthy state of the pulp only if the tooth cavity is accidentally opened during the preparation of an intact tooth or as a result of trauma with a crown fracture. With communication between the opened tooth cavity and the oral cavity, infection of the pulp may occur over time. After opening the intact pulp in the surface layer of the damaged area, already after 48 hours, an accumulation of cells - inflammation markers - is detected. Therefore, direct pulp capping must be performed no later than 2 days from the date of injury. According to Leif Tronstad, with the correct treatment in teeth with an accidentally opened pulp chamber, this method gives 90% of successful results.

Vital pulpotomy allows painless treatment of pulpitis in one visit, so this technique is considered a priority.

The formocresol-pulpotomy method has long been well established in the world of pediatric endodontics, and it is preferred in temporary teeth.

As a result of a 5-minute exposure of the drug to the root pulp, its surface layers are fixed while maintaining the vitality of the pulp tissue in the apical part. Histologically, several zones are found in the pulp as a result of exposure to formocresol: 1) a wide zone of fixation at the point of contact of formocresol with the pulp; 2) the underlying zone of atrophy of cells and connective tissue fibers; 3) a wide zone of "inflammatory" cells; 4) normal (unchanged) pulp tissue. For this method, in most cases, a 1:5 diluted formocresol (Buckley formocresol) is used. To obtain it, one part of formocresol is combined with three parts of glycerin and one part of distilled water. Buckley's original formocresol is composed of equal parts formaldehyde and cresol. Commercial modification of the drug: 19% formaldehyde, 35% cresol in a solution with 15% glycerol and water. Indication for vital pulpotomy: - the presence of a clinical or radiographic opening of the cavity of a tooth of carious or traumatic genesis with a viable pulp, when inflammation is limited to its crown part, not spreading to the root.

Calcium hydroxide pulpotomy is performed when direct or indirect pulpothrapy is impossible or unsuccessful, as well as for traumatic injuries of unformed permanent teeth, if the size of the opening of the tooth cavity exceeds 1 mm, more than 2 hours have passed after the injury, and pulp infection is possible. The inflammatory process can affect only the coronal pulp without significant tissue changes in the root canals. An extensive network of blood vessels in the apical third of the developing root with a large number of anastomoses and cellular elements ensures the protective function of the pulp and tissues surrounding the tooth, helps prevent the development of acute inflammatory processes in the developing tissues [4, 8].

The reactions that develop in the tissues in response to the action of calcium hydroxide during pulpotomy are similar to those that occur during direct pulp capping. Contact of the drug with non-inflamed tissues leads to the formation of a zone of necrosis and the formation of a dentinal bridge. Next, the underlying layers of the pulp are regenerated. The response of inflamed tissues to the application of the drug can be different: from complete regeneration to the development of chronic inflammation or pulp necrosis. Sometimes, with severe damage to the coronal pulp, the amputation

line is displaced in the apical direction to viable tissues. This manipulation is called high amputation [3, 5, 6].

Method of pulpectomy Treatment of pulpitis by pulpectomy involves the removal of the coronal and root pulp under anesthesia or after preliminary devitalization, followed by obturation of the root canal.

Conclusion. The prognosis of the results of treatment of pulpitis in children depends on the form of pulpitis, choosing the right treatment method adherence to intervention techniques and qualifications of a doctor, mandatory dynamic monitoring.

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